EARTH SCIENCE DATA AND INFORMATION SYSTEM

ESDIS Mission Systems Configuration Management Plan (MSCMP)

December 1997

National Aeronautics and
Space Administration

Goddard Space Flight Center
Greenbelt, Maryland

ESDIS MISSION SYSTEMS CONFIGURATION MANAGEMENT PLAN

December 1997

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1.0   INTRODUCTION

This document is the ESDIS Mission Systems (MS) Configuration Management Plan (CMP) referred hereafter as MSCMP.

1.1   PURPOSE

The MSCMP describes the process and procedures that will be followed for the management of the overall, integrated ESDIS MS configuration.

1.2   SCOPE

The MSCMP establishes the configuration management process, identifies the organizations and personnel involved, the roles, the responsibilities, and defines the procedures to be followed for the maintenance of configured systems for test and operations.

The plan applies to the ESDIS MS Elements in GSFC Building 32, namely EBnet/Nascom/NISN, EDOS, FOS, and ETS. Other mission operations organizations which deliver systems to Building 32 are also covered under this plan, including the Flight Dynamics Division (FDD), Spacecraft Project-provided simulators and analysis systems/software, NSI Interface, and the SMC interface. Note that the plan does *not* address the configuration management of the Science Data Processing Systems (SDPS) or systems at external sites.

1.3   OBJECTIVES

The basic objective of the MSCMP is to implement and maintain an effective configuration management system across ESDIS MS Elements in Building 32 which will:

- Identify mission systems baselines
- Track changes to mission systems baselines, and
- Maintain a MS CM database and issue system configuration reports

1.4   RELATIONSHIPS TO OTHER PLANS

The MSCMP is consistent with the Maintenance and Operations (M&O) configuration management plans issued by the individual mission systems Element organizations. The MSCMP tracks the front-end system configuration from an overall EOS Ground System (EGS) Mission Systems perspective. Related plans are listed in Table 1.1.

Table 1.1 Mission Systems Element Configuration Management Plans

ELEMENT	PLAN
FOS	Maintenance and Operations Configuration Management Plan for the ECS Project (102-CD-002-001)
FOT	TBS

EDOS	Contractor Configuration Management Plan (CDRL A141)
	EDOS Configuration Management Plan 560-EDOS -0906.0003R1
EBnet	Nascom Configuration Management Plan
ETS	ESDIS MSCMP (this plan)

2.0 MS CONFIGURATION MANAGEMENT ROLES AND RESPONSIBILITIES

ESDIS MS personnel provide support to the configuration management process. Their responsibilities are outlined below.

2.1 ESDIS Mission Operations Manager (MOM)

The MOM is responsible for the management of the overall ESDIS Mission Systems operations infrastructure for the successful and cost-effective support of mission operations. The configuration management functions addressed in this document will be performed by the MS operations configuration engineer under the direction of the MOM and in conjunction with configuration management personnel from each MS Element.

2.2 ESDIS Mission Systems Chief

The Chief of the MS group exerts technical and management control over all Elements and chairs periodic staff meetings with the MS Element Managers. The group meets as needed to evaluate, approve, or reject proposed changes to the MS operational systems baselines.

2.3 ESDIS Mission Directors (MDs)

The MDs provide dedicated flight operations management support for the EOS spacecraft and handle the EOS flight operations management for the life of the mission. The MDs oversee the CM process for the flight-unique operations configuration items which are managed within the Flight Operations Team (FOT) Configuration Control Board (CCB).

2.4 ESDIS Mission Systems Element Managers

The MS Element managers provide key support for coordinating system deliveries and identifying changes. They or their designee (e.g., system administrator) provide MS CM personnel with access to system configuration data, including control change reports (CCRs), installation details, etc.

and change notices which are received from the MS Elements. The procedures for this information flow is defined in the following sections.

3.2.1   Mission Systems Baselines

A system delivery provides the most important information to identify the system baseline.

Prior to a system delivery, the cognizant ESDIS Mission Systems Element manager (or his designee) shall notify the ESDIS MOM of a planned delivery item, the planned delivery date and the products to be included in the delivery.

For the delivery, the Element manager shall ensure that a copy of the delivery letter signed by a representative from the Element contractor (Contracting Officer or Project Manager) is provided to the ESDIS MOM. The delivery letter identifies the Element version number and the delivery contents.

A delivery's contents are defined in contractual requirements, but generally consists of the system on media (2 copies), supporting documentation, and a delivery letter. The Element manager or his designee provides the delivery package to the ESDIS Data Management Office (DMO) for distribution. One copy of the system media is stored in the ESDIS Library and the other provided to the MS configuration engineer. When software delivery is done via electronic transfer, the software location must be specified in the delivery documentation.

3.2.2   Changes To Mission Systems Baselines

The individual Mission System Elements do not need external approval authority for most of their system changes (i.e., those not involving changes in cost, schedule, or interfaces), but they are responsible to notify MS CM personnel of the changes. The ESDIS Mission Systems Configuration Management (MSCM) Form (Figure 3.1), or its electronic mail equivalent (Figure 3.2), is the mechanism used for this notification and shall be submitted to the ESDIS MOM for both formal and informal deliveries, as well as changes which result from a CCR but are not included in a delivery (e.g., hardware changes). A formal delivery is either a planned, pre-defined and scheduled contractor deliverable or an official delivery of an interim Version containing one or more engineering patches that correct defects or deficiencies in a delivered version. An informal delivery is for intermediate "engineering" mode versions or patches not officially delivered but nevertheless installed in the operational facility, pending additional testing.

The MSCM form captures CM information used to identify and track system configuration changes, including installation information that is normally not included in a delivery package. As a rule, references to related documentation (i.e., CCRs) should be included to minimize repetition of information on the form.

3.2.3   CM Database and Reporting

MS CM data will be stored in the Configuration Tracking System (CTS). The CTS database contains the configuration data for all MS configuration items (CIs). In addition, CTS provides status reports on the existing system configuration and change data per CI.

CTS tracks the configurations for the <u>engineering test baseline</u>, <u>formal test baseline</u>, and <u>operational baseline</u> and provides this information from both a current and historical perspective. The sources of the configuration information are primarily the MS CM form as well as the delivery packages for new releases and CCRs for system modifications.

The CTS consists of FileMaker Pro databases which reside on an Internet server providing remote data entry and reporting via the World Wide Web.

ESDIS Mission Systems Configuration Management Form

1. ORIGINATOR	2. ORGANIZATION	3. PHONE	4. E-MAIL ADDRESS

5. CHANGE TITLE	6. SOURCE CHANGE REQUEST(S)

7. SYSTEM/ CONFIGURED ITEM(S____)

8. INSTALLATION DESCRIPTION_____ (Attach or refer to available documentation)

9. INSTALLATION DATE	10. INSTALLED BY	11. CM TRACKING NO.
_____/_____/_____	_____	

12. COMMENTS

Form MSCM (970619)

Figure 3.1 - ESDIS Mission Systems Configuration Management (MSCM) Form

```
ORIGINATOR:
ORGANIZATION:
PHONE:
E-MAIL ADDRESS:
CHANGE TITLE:
SOURCE CHANGE REQUEST(S):
SYSTEM/CONFIGURED ITEMS:
INSTALLATION DESCRIPTION:
INSTALLATION DATE:
INSTALLED BY:
CM TRACKING NO.

COMMENTS:
```

Figure 3.2 - ESDIS Mission Systems Configuration Management (MSCM) E-Mail Form

Table 3.1 - Field Definitions for the ESDIS MSCM Form

FIELD   DESCRIPTION

1.- 4.   **ORIGINATOR, ORGANIZATION, PHONE,** and **E-MAIL ADDRESS**: Self
         explanatory.

5.   **CHANGE TITLE**: Self explanatory.

6.   **SOURCE CHANGE REQUEST(S)**: List applicable source(s) such as CCRs, DRs, etc. This
         information is required for tracking change approval responsibility.

7.   **SYSTEM/CONFIGURED ITEMS**: Identify what system/string/ CIs are being changed and
         provide a brief description of the change

8.   **INSTALLATION DESCRIPTION**: Brief but specific description of the installation change.

9.   **INSTALLATION DATE:** Self explanatory

10.   **INSTALLED BY:** Self explanatory

11.   **CM TRACKING NO.**: Do not fill in.

12.   **COMMENTS:** For any additional/related information on the change.

4.0   MISSION SYSTEMS DISCREPANCY REPORT MANAGEMENT

The MS Discrepancy Report (DR) reporting and resolution process is detailed in Appendix-A.

Appendix A -   Mission Systems Discrepancy Reporting And Resolution Process

A.1   Discrepancy Report (DR) Functions

A.2   Discrepancy Reporting Levels

A.3   DR Process

A.1   DISCREPANCY REPORT (DR) FUNCTIONS

Discrepancy Reports (DRs) are used to:

1. Report and describe all problems experienced during the post-delivery phase by the organizations shown in Table A-1
2. Identify the level of severity of the problem encountered
3. Facilitate and track problem analysis, resolution, and closure

Problems/anomalies experienced by the system developer during pre-delivery phase and which have not been resolved by the time of delivery are also documented using DRs (e.g., the FOS Non-Conformance Reports [NCRs] outstanding at the time of the FOS delivery are converted to DRs).

Table A-1 -- Acceptance/Confidence Test And Operations Organizations

ELEMENT	TEST TEAM	OPERATIONS TEAM
EDOS	CNMOS	CNMOS
FDS	NASA and CNMOS	CNMOS
FOS	IV&V	Lockheed Martin
EBnet	CNMOS	CNMOS
ETS MPS	CNMOS	CNMOS
ETS HRS	CNMOS	CNMOS
ETS LRS	CNMOS	CNMOS

A.2   DISCREPANCY REPORTING LEVELS

System users, testers, and operations personnel report discrepancies using DRs. A discrepancy reporting level is associated with each DR which identifies the management responsibility for the disposition, tracking and resolution of the DR. The three discrepancy reporting levels are:
- EOSDIS Ground System (EGS) level
- Mission Systems level
- Element level

Table A-2 summarizes the discrepancy reporting levels and the responsible organizations.

DRs at the EGS level document problems experienced during EGS level testing that involve both MS and Science Systems Elements, such as the EDOS/DAAC, the EDOS/ASTER ICC, and the FDS/DAAC interfaces. These DRs are managed by the EGS Test Manager through the EGS Discrepancy Review Board (EGS DRB).

DRs at the MS level are managed by the MS Integration Manager through the MS Discrepancy Review Board (MSDRB). These DRs address discrepancies among MS Elements, between MS Elements and the spacecraft, and with network interfaces among the MS Elements. Mission Systems DRs also document problems experienced during formal end-to-end and spacecraft compatibility tests.

DRs at the MS Element level document problems internal to an MS Element (e.g., system crashes, system defects). These DRs are managed by the Element Manager through the Element DRB. For the FOS, the Mission Director (MD) co-chairs the FOS DRB with the FOS Manager or designee. Note that problems experienced with flight-specific items such as operations procedures, operations page displays are processed by the Flight Operations Team (FOT) CCB which is chaired by the MD.

Table A-2 -- DISCREPANCY REPORTING LEVELS

| LEVEL | PROBLEM SCOPE | MANAGEMENT | | |
		REVIEW BOARD	LEAD	MEMBERS
EGS	• Problems experienced during EGS level testing • Problems between Mission Systems, Science Systems, other ground data systems	EGS Discrepancy Review Board (EGS DRB)	EGS Test Manager	EGS team members
Mission Systems	• All problems related to Mission Systems Element interfaces • Network related problems • Problems experienced during end-to-end and spacecraft compatibility tests	Mission Systems Discrepancy Review Board (MSDRB)	Mission Systems Integration Manager	MS Element leads
Element	• Problems internal to Element	Element DRB	Element manager	Development, Test, and Operations leads

A.3   DR PROCESS

Mission Systems uses the ESDIS Discrepancy Report Tracking Tool (DRTT) to manage the DRs. The DRTT is a modified commercial-off-the-shelf (COTS) product which resides on a SUN Sparc 2000 system maintained and administered by the CNMOS contractor for the ESDIS Project. The DRTT System User's Guide is available on the WWW at the URL http://iree.gsfc.nasa.gov/ddts/.

The DR process is based on the reporting level concept described above. The items below provide more description of the process at each level:

1.   DRs generated during EGS level testing are the EGS Test Manager's responsibility. The EGS Test Manager reviews these DRs at the EGS DRB and assigns them to the

appropriate Element(s). The Element leads then analyze the problems and determine if they are covered by existing open Element DRs. If so, a parent link is established on the Element level DR to the EGS DR. If not, new Element level DRs are written by the Elements and linked back to the EGS level DR. The Element develops the fixes and closes the Element level DRs when the delivered changes have been tested and verified by AT and operations personnel. The corresponding linked EGS level DR is closed only by the EGS Test Manager upon EGS level re-test and verification that the problem has been resolved.

2. DRs generated during MS level testing are the MS Integration Test Manager's responsibility. The MS Integration Test Manager reviews these DRs at the MS DRB and assigns them to the appropriate Element(s). The Element leads then analyze the problems and determine if they are covered by existing open Element DRs. If so, a parent link is established on the Element level DR to the MS DR. If not, new Element level DRs are written by the Elements and linked back to the MS level DR. The corresponding linked MS level DR is closed only by the MS Integration Test Manager upon MS level re-test and verification that the problem has been resolved.

3. DRs marked as Element level DRs are the Element Manager's responsibility. They are reviewed and dispositioned by the Element DRB chaired by the Element Manager (or designee). The MD co-chairs the FOS DRB. Element level DRs are closed upon concurrence by the Element Manager and the Element operations lead that the problem has been resolved. The processing of an Element DR is depicted in Figure A-1.

Figure A-1. Typical MS Element DR Processing
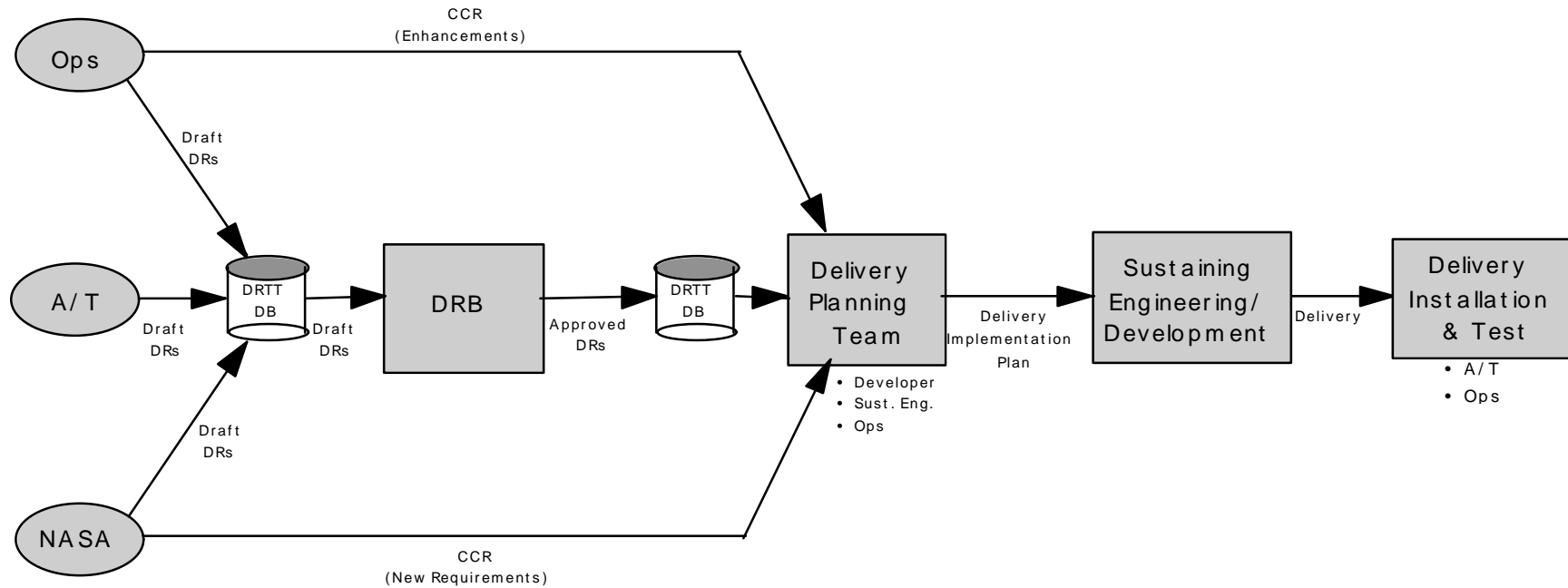
Note: Not shown is the interface with the ESDIS Project CCB for DRs and CCRs which affect cost, schedule, requirements, or external interfaces (e.g., Flight Projects)

Appendix B - FOS System Modification Process

B.1   FOS Teams and Functions

B.2   Modification Process

B.1   FOS Teams and Functions

This appendix describes the overall FOS system modification process as currently implemented post FOS Release B Release Readiness Review (RRR), version 2.0.0. This section outlines the primary functions of the teams as they interact in the modification process.

- The ECS FOS development organization provides systems enhancement support and implements additional system functionality/capability to meet new requirements.

- The ECS FOS sustaining engineering organization is dedicated to fix problems with the delivered systems, i.e. discrepancy reports and to implement desired system enhancements identified by the Fight Operations Team to improve system usability.

- The ECS Flight Operations Team (FOT) is the central organization which operates the systems, interfaces with the Instrument Operations Teams, and is an active participant in each of the steps outlined in Figure B-1. The FOT documents all problems experienced using the ESDIS Discrepancy Report Tracking Tool (DRTT).

- The Independent Verification and Validation (IV&V) contractor performs key testing activities to verify and validate the systems' functionality. The IV&V contractor documents all problems experienced using the ESDIS Discrepancy Report Tracking Tool (DRTT).

- The Instrument Operations Teams (IOT) as users report all problems experienced with the Instrument Support Toolkit (IST) via the Trouble Ticket (TT) system.

B.2   Modification Process

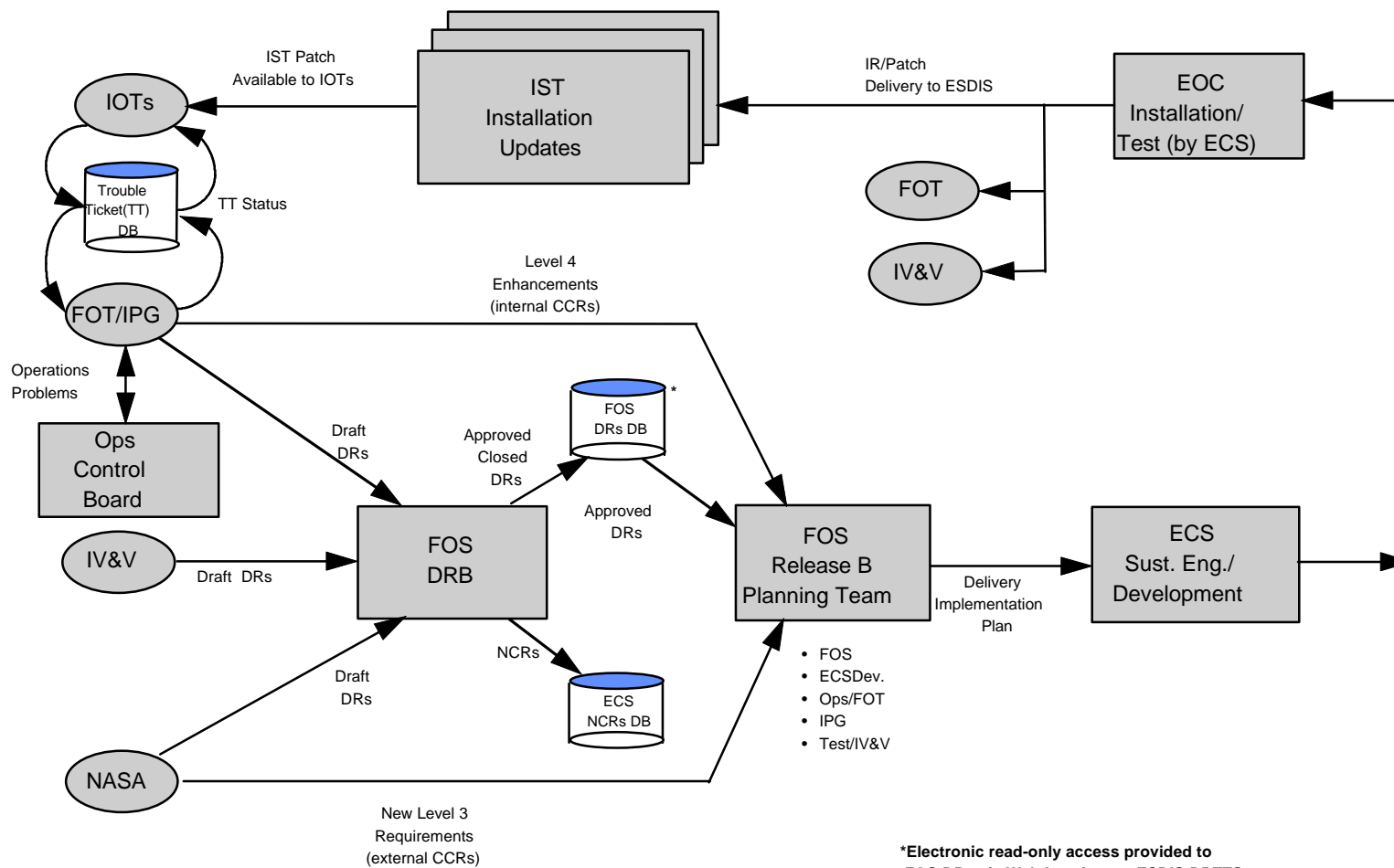The following describes the process depicted in Figure B-1.

IOT

- The IOTs report system problems to the EOC by submitting TTs. The IOTs also use the TTs to document problems with operations-related items (e.g., ECL procedures).
- The IOTs currently submit TTs via a formatted e-mail message to the following address "isttrbl@eoc.ecs.nasa.gov" . The FOT administrator receives the message and sends back the disposition by e-mail.
- In the future, a COTS software package called Remedy will be used. The IOTs will have the capability to submit TTs and query TTs status via an internet browser (e.g., Netscape) at the url "http://kodiaks.eoc.ecs.nasa.gov".

EOC TT Database

- The TT database is administered by the FOT. TTs are evaluated and assigned by the FOT. The FOT will submit draft DRs, if appropriate, close the TT with the assigned DR number and update the status in the database.

Figure B-1. FOS System Modification Process Flow

IST Patch
Available to IOTs

IOTs

IST
Installation
Updates

IR/Patch
Delivery to ESDIS

EOC
Installation/
Test (by ECS)

Trouble
Ticket(TT)
DB

TT Status

FOT

IV&V

FOT/IPG

Level 4
Enhancements
(internal CCRs)

Operations
Problems

Ops
Control
Board

Draft
DRs

Approved
Closed
DRs

FOS
DRs DB *

Approved
DRs

FOS
Release B
Planning Team

Delivery
Implementation
Plan

ECS
Sust. Eng./
Development

IV&V

Draft DRs

FOS
DRB

NCRs

ECS
NCRs DB

• FOS
• ECSDev.
• Ops/FOT
• IPG
• Test/IV&V

Draft
DRs

NASA

New Level 3
Requirements
(external CCRs)

***Electronic read-only access provided to
FOS DRs via Web Interface to ESDIS DRTTS**

December 05, 1997

B-4

- For TTs documenting operations-related items (e.g., ECL procedures, hardware and system configuration anomalies), the FOT will work the problem through the Operations Control Board and close the TT once the problem is solved. These TTs will not result in the generation of FOS DRs.

FOS DRB

- The FOS Discrepancy Review Board (DRB), chaired by NASA, dispositions the FOS DRs which have been electronically submitted by the FOT, IV&V and NASA teams via the web interface into the ESDIS DRTT system.
- The DRB consists of members from the IV&V test team, the FOT, the FOS ECS team and the FOS NASA team.
- The FOS DRB reviews the draft DRs for content, severity level and status. The DRB determines if the draft DR is valid as well as the severity level recommended by the originator. The FOS DRB also controls the state of all FOS DRs in the DRTT database. The DRB updates the DR state value accordingly as the fix for the problem migrates through, from being worked on, to being delivered, tested, verified and accepted.
- The FOS DRB verifies that links between DRs and the ECS Non Conformance Reports (NCR) are maintained as described in the next paragraphs.

ECS FOS Contractor Internal NCRs Database

- For each approved DR, a partner NCR will be generated in the FOS ECS contractor internal NCR database, with the NCR containing a reference to the "related DR". This is performed by the FOS ECS development contractor.
- Likewise, the "related NCR" number is entered into the DR once the NCR number is known. This is handled by the FOS DRB.

FOS Release B Planning

- The FOS Release B Planning Team is chaired by NASA and is comprised of government and contractor representatives from the development and operations teams. The operations teams include both the FOT and the Instrument Planning Group (IPG).
- The team is tasked to coordinate and plan the schedule for and content of future patches and incremental releases in terms of fixes, enhancements and new requirements. The Planning Team will ensure that new capabilities are accounted for in the appropriate future incremental release or patch delivery scheduled on a timely basis. The process is largely driven by the prioritization of activities by the operations teams.

ECS FOS Development and Sustaining Engineering

- The ECS FOS development organization is tasked with the development of adding capabilities as requested through ESDIS CCRs. The ECS FOS sustaining engineering organization is responsible for fixing problems as documented in DRs and NCRs, and implementing operations enhancements as documented in FOT- generated CCRs.

EOC Installation /Test (by ECS)

- The ECS FOS development contractor delivers the new releases/patches to the EOC for installation following the CM practices described in this plan and the ESDIS CM plan.

- The ECS FOS test team performs an internal system test prior to delivering the system to ESDIS, where it is then available to the IV&V contractor and the FOT for testing and verification.

IST Installation

- The ECS FOS contractor installs the incremental/patch release at each of the IST sites after the formal system delivery is made to ESDIS. This involves a detailed level of coordination with the IOTs, FOT, IPG and NASA.